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AUTHOR Gamoran, Adam; Weinstein, Matthew
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ABSTRACT

Research on stratification in schools shows that the differentiated structure of schools is associated with increasing inequality of educational outcomes. Some writers have therefore advocated "detracking"--the elimination of stratification within schools. Other writers have suggested that differentiation within schools is possible without the harmful effects of tracking. This paper examines 24 highly restructured schools, using qualitative and quantitative data collected at the Center on Organization and Restructuring of Schools at the University of Wisconsin-Madison. The data show, first, that detracking is a goal that is idealized more often than it is achieved. Detracking appears to face more barriers in secondary than in elementary schools, and it is resisted in math more than in other subjects. Close analysis of two cases--one high school and one middle school--show that neither heterogeneous nor homogeneous grouping present insurmountable barriers to high-quality instruction; however, neither approach ensures effective teaching. Conditions that supported high-quality instruction in a mixed-ability context included small class sizes, extra resources that permit a highly individualized instructional approach, strong intellectual leadership, and selection of teachers and students. Conditions that supported effective instruction in the context of differentiation included a commitment to equity across classes, teacher and student selection of course, and teachers' intellectual commitment to the subject matter. One table is included. (Contains 23 references.) (Author/LMI)

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DIFFERENTIATION AND OPPORTUNITY IN RESTRUCTURED SCHOOLS

Adam Gamoran
University of Wisconsin-Madison

Matthew Weinstein
Macalester College

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DIFFERENTIATION AND OPPORTUNITY IN RESTRUCTURED SCHOOLS

ABSTRACT

Research on stratification in schools shows that the differentiated structure of schools is associated with increasing inequality of educational outcomes. In response to this finding, some writers advocate "de-tracking," i.e. elimination of stratification within schools. Other writers suggest that differentiation within schools is possible without the harmful consequences of tracking. This paper examines 24 highly restructured schools using qualitative and quantitative data collected at the Center on Organization and Restructuring of Schools. The data show, first, that de-tracking is a goal that is idealized more often than it is achieved. De-tracking appears to face more barriers in secondary than in elementary schools, and it is resisted in math more than in other subjects. Close analysis of two cases show that neither heterogeneous nor homogeneous grouping present insurmountable barriers to high-quality instruction; but neither approach ensures effective teaching, either. Conditions that support high-quality instruction in a heterogeneous context include small class sizes, extra resources that permit a highly individualized approach to instruction, strong intellectual leadership, and selection of teachers and students. Conditions that supported effective instruction in the context of differentiation included a commitment to equity across classes, teacher and student selection of courses, and teachers' intellectual commitment to subject matter.

DIFFERENTIATION AND OPPORTUNITY IN RESTRUCTURED SCHOOLS

Perhaps the most important contribution by sociologists to the study of American education is the knowledge that academic achievement varies far more within schools than between schools (e.g., Coleman et al., 1966; Jencks et al., 1972). Stimulated by this finding, later researchers showed that the diversity of outcomes within schools was tied to the differentiated structure of schools (e.g., Heyns, 1974; Alexander and McDill, 1976; see Gamoran and Berends, 1987, for a review). The various tracks, classes, and instructional groups into which students are divided constitute hierarchies at a given grade level, and students' achievement outcomes tend to vary according to their positions in these hierarchies. Even after taking account of initial differences among students, researchers found that the stratified structure of schools contributes to inequality. More recent writers added evidence that the impact of stratification on achievement is mediated by variation in the quality and quantity of instruction that occurs in different groups, classes, and tracks (e.g., Rowan and Miracle, 1983; Gamoran, 1986, 1987; Gamoran et al., 1992; Hoffer and Gamoran, 1993). Compared to their lower-ranked peers, higher-ranked students often cover more challenging material at a faster pace with more enthusiastic teachers, and this accounts for much of their achievement advantage (after pre-existing differences between high- and low-ranked students are controlled) (see Oakes, Gamoran, and Page, 1992, for a review). Thus, over a period of thirty years, sociologists have shown that outcomes vary widely within schools, that these varied outcomes are linked to the differentiated structure of schools, and that one reason structural differentiation has such an impact is that it provides a context for differentiated processes, i.e. varied activities of classroom instruction.

In response to this and related work, many of those writing on education have called for eliminating stratification in schools (e.g., Oakes, 1985, 1994; Wheelock, 1992). These writers argue that differentiation leads to inequality of opportunity within schools. To combat inequality, they assert, tracking should be abolished. "De-tracking" has become a prominent element in many educational reform efforts, particularly in those tied to the broad collection of reforms known as "school restructuring." Restructuring advocates

maintain that the problems with American education are so deep and fundamental that they can only be addressed with a radical restructuring of schools. De-tracking is central to many restructuring plans.

In this paper, we make use of a study of restructured schools at the Center on Organization and Restructuring of Schools to address questions about differentiation and opportunity in restructured schools. How extensive is de-tracking, or mixed-ability grouping, among restructured schools? How much concern is there about problems of unequal opportunities, and what other solutions besides mixed-ability grouping are attempted? Does mixed-ability grouping lead to high-quality instruction for all students? Does high-quality instruction ever occur in classes designated for low-achieving students? In response to these questions, we draw on data from 24 case studies of restructured schools: 8 high schools, 8 middle schools, and 8 elementary schools located all over the United States. We also use a larger nationwide sample of 308 schools that were nominated as highly restructured, to show the extent of concern with differentiation and opportunity in restructured schools.

A Conception of Differentiation and Opportunity

It is clear from research and everyday experience that stratification is pervasive at all levels of the school system -- elementary, middle, and high schools. At each grade level one may find students divided into groups, classes, or tracks that differ both in the types of students assigned and, correspondingly, in the instructional processes that occur. The rationale behind this structure is that it permits students to receive instruction that meets their needs and abilities. According to this view, because students vary in their academic backgrounds and capacities, they can be taught more effectively when they are grouped with others whose needs are similar to their own.

In practice, researchers have shown, grouping and tracking rarely work out this way. Over time, the gap between high-achieving and low-achieving students expands, and tracking plays a causal role in this process (Gamoran and Mare, 1989). Moreover, while high-track students often learn more than similar students in mixed-ability classes, low-track students tend to learn less than comparable peers in mixed-ability

classes (Kerckhoff, 1986; Hoffer, 1992; Gamoran and Nystrand, 1994; see Slavin, 1990, for debate about this conclusion). One important reason for the increasing inequality of achievement is that instruction is not equally allocated across groups and tracks. Teachers in high tracks tend to be more enthusiastic, cover more complex material at a faster pace, and to place greater emphasis on critical thinking and problem solving, whereas instruction in low tracks is more often fragmented, focusing on isolated and simplified bits of information (see Oakes, Gamoran, and Page, 1993, for a review). Hence, differentiation within grade levels results in a hierarchy of tracks, classes or groups, and the unequal distribution of instruction across levels of the hierarchy -- that is, unequal opportunity to learn -- leads to achievement inequality.

Theoretically, one may conceive of two practical responses to this situation. One is "de-tracking," strongly advocated by many writers. In this solution, students are grouped with others of widely varying interests and abilities for instruction. This solution has much to commend it, as it directly combats the problem of unequal opportunities by providing the same opportunities for all students. However, it may not address the problem that led to differentiation in the first place --students vary in their needs and capacities, and different types or rates of instruction may work better for different students. In addition to this technical consideration, de-tracking is difficult to implement because of normative pressures to recognize differences among students and political pressures to retain separate classes, particularly for high-achieving students (Oakes, 1992).

The other solution is to maintain some degree of differentiation, but in doing so to improve the quality of instruction in low tracks. In this solution, equal opportunity occurs when all students receive instruction that is equally suited to their needs, but because their needs vary, instruction would not be identical in all contexts. This approach, however, fails to address the problem that tracking and ability grouping constitute not merely differentiation but stratification -- that is, an unequal allocation of status -- which typically leads to an unequal distribution of resources such as curricular materials, teaching competencies, and abilities of peers. Also, by creating a status hierarchy within schools, this approach

reinforces normative views about unequal cognitive abilities which may contribute to broader inequities outside schools (Oakes, 1992). Finally, it is unclear whether it is possible to organize classes that actually contain a narrow range of student ability. Although ability groups are supposed to be "homogeneous," inevitably there is substantial variability within groups and overlap between groups, so the idea that instruction can be targeted to student needs is problematic.

Both approaches offer possible solutions to the problem of unequal opportunities, but each faces its own particular challenges. If de-tracking provides the same opportunity to all students, how can it ensure that all students, including those who are strongest academically, are challenged and grow in their learning? If ability grouping is maintained but improved by offering high-quality instruction in low tracks, how can this system overcome the stigma and the unequal allocation of resources that so often accompany low-track assignment?

Restructured schools concerned with the problem of unequal opportunities may select either approach in response. In examining restructured schools, we may ask, first, what effort is made to address the problem of differentiation and inequality of opportunity? Second, if mixed-ability grouping is used, how are students at varied achievement levels challenged and stimulated to learn? Third, if ability grouping is maintained, what is the quality of instruction in lower-ranked classes? It is likely that both solutions may result in improved opportunities for students in some cases, and fail to improve opportunities in other cases. That finding would raise a fourth question: What conditions encourage successful implementation, whichever solution to the problem of unequal opportunities is selected?

The School Restructuring Study

We examined schools from the study of restructured schools at the Center on the Organization and Restructuring of Schools (CORS). To identify restructured schools, CORS researchers first identified four areas in which schools may exhibit innovative structures: student experiences; professional lives of the teachers; leadership, management and governance; and coordination of community services. Restructuring in

the four areas could be identified through responses to 38 questions about a school, covering matters such as curricular integration, staff collegiality, mentoring programs, and so on. One question in the domain of student experiences was "Do students spend most of their time in heterogeneous groups?"

To find schools that were restructured along these dimensions, CORS called for nominations from across the country. A total of 308 schools were nominated. After an initial screening, 254 schools were called back for further screening through a telephone interview. Subsequently, 53 schools received a site visit from CORS researchers, and 24 schools were selected for intensive study. The 24 schools were selected first and foremost as those that best exhibited substantial innovative practices in the four areas. Second, equal numbers of elementary, middle, and high schools were chosen. Third, selected schools were geographically dispersed.

The 24 selected schools were each studied for one year. Teams of three researchers visited the schools for one week in the fall and one week in the spring. The teams interviewed teachers representing a variety of grades and subjects in the school, as well as administrators, district personnel, parents, and representatives from key agencies which had impacted the innovations happening at the schools. In addition, two subjects (math and social studies) and one grade level (fifth, eighth, or tenth) was targeted at each school. Three teachers from each target subject area at the target grade were selected for greater study. They were observed twice each visit, responded to a structured interview about the influence of restructuring on their teaching, and submitted to CORS in both fall and spring a class set of student work selected for its "authenticity," i.e., demand for higher order thinking, depth, and application to "real world" problems, were collected and sent to CORS each semester. Finally, two additional teachers were selected by the principal as representing the highest quality instruction in their school, and their classes were observed once.

The observed lessons, submitted task and the students' work were each scored on a variety of scales. The classroom instruction was rated by the CORS observers as to the degree of higher order thinking we saw the students engaged in, depth of knowledge in the task, extent of substantive dialogue in which students

engaged, and the degree of application the teacher's lesson seemed to have in the students' lives. The task accompanying the student work that the teacher submitted to CORS was scored by one teacher from the appropriate subject area and one CORS staff person together in four broad areas: depth of understanding, disciplinary grounding, and value beyond the task required by the structure and content of the task. Finally, the student work itself was scored on three scales by specially trained math and social studies teachers. In math, the scales were communication, concepts, and analysis; similar scales were used in social studies.

Perceived Extent of De-Tracking in Restructured Schools

Responses from the nominated schools provide a sense of how pervasive de-tracking is among schools that are trying to restructure. Of the 300 completed nomination forms, 277 (92%) answered "yes" to the question: "Do students spend most of their time in heterogeneous groups?" Similarly, 234 (92%) of the 254 schools that received follow-up interviews by telephone responded "yes" to this question on the nomination form. However, upon further probing, the telephone interviewers determined that only 126 schools, just under 50%, made extensive use of mixed-ability grouping. In the rest of the schools, students spent substantial amounts of time in ability groups or tracks. (See Berends and King, 1994, for an earlier report of this finding using partial data.)

What forms of grouping appeared in schools that initially claimed to be de-tracked, but on closer examination proved to be at least partially stratified? Interviewer summaries in most cases indicated what sort of grouping occurred. Table 1 shows that at the high school level, almost all of these schools used between-class grouping for math. In addition, most had between-class grouping for social studies, and a substantial number had special honors classes in math. Interestingly, none of the high schools had separate remedial classes in any subject. This may reflect efforts to move away from low-level, dead-end classes, where ability grouping is not totally eliminated.

Middle schools exhibited a similar pattern, but elementary schools were more varied, with some classes using between-class grouping and some within-class, and some using grouping for math while others

grouped for social studies or other subjects. Our analysis of elementary schools is hampered by substantial missing data; only 27 of the 47 elementary school interviews provided details on grouping. (This contrasts with 31 of 43 high school interviews and 33 of 37 middle school interviews.) We surmise that many of these elementary schools used within-class grouping for reading, which was not a major focus of the interviews.

These figures enlighten us about schools for which mixed-ability grouping is a stated ideal that is at best partially achieved. In these schools, grouping is more pervasive -- that is, it occurs in a wider variety of subjects -- in high schools than in elementary or middle schools. For the most part, especially in middle and high schools, mathematics appears most resistant to the elimination of ability grouping. Although many schools maintain honors classes, virtually none have distinct remedial classes.

These findings raise deeper questions about the implementation of both ability grouping and mixed-ability grouping in restructured schools. Would the findings about differences between subjects and between levels of the school system stand up to further probing? Is it correct to surmise that de-tracking is often desired but less often attained? Where ability grouping is maintained, does it result in the usual inequalities of opportunity? Where ability grouping is eliminated, do all students receive high-quality instruction? To address these questions, we turn to the case studies of 24 restructured schools.

Differentiation and Opportunity in Restructured Schools

Among the 24 schools selected for intensive study, we considered how many have confronted issues of differentiation and opportunity. We examined whether their solutions involved reducing or eliminating grouping and tracking, and whether their solutions were successful. By successful, we mean that students were allocated to classes that provided comparable opportunities to engage in high-quality academic work. We define high-quality academic work as extensive higher-order thinking, depth of knowledge, and discussions of substantive issues in class, and rigorous authentic tasks for student work. Data on these indicators comes from observers' reports and from student tasks submitted by teachers, as described earlier.

High Schools

Ability grouping (or tracking) was a prominent topic of debate and discussion in the eight high schools studied. In four schools, it was probably the singled most talked-about issue. In these schools, teachers and administrators often made comments such as, "Eliminating tracking is our number one priority." In several cases, problems associated with de-tracking were also a major area of staff discontent. Overall, observers found serious and often heated debate about this topic. Teachers did not hesitate to state their divergent views. We found teachers disagreeing with other teachers, teachers in disputes with administrators, and parents expressing desires contrary to those of teachers (as reported by teachers).

In all eight schools, staff were concerned about providing equal learning opportunities for diverse students. In two schools, the main response was to offer an extensively differentiated program. For example, educators in Island Lake High School (all school names are pseudonyms) identified a large number of special needs groups, including at-risk students, pregnant students and mothers, potential dropouts, students who need vocational skills, students who need to catch up academically, and so on. For each of these groups a separate program was created. In some cases, students were further differentiated within programs. Neither of the two highly differentiated high schools provided evidence of extensive authentic instruction for all students. To the extent our observations included classes at different achievement levels, we often found higher-quality instruction in classes for more academically-oriented students.

The other six high schools promoted mixed-ability classes. Each was characterized by a strong rhetoric of de-tracking. Three schools achieved this goal; that is, there were no divisions by ability or performance of any kind. In the other three schools, a group of teachers had resisted mixed-ability grouping, and students were divided heterogeneously in some subjects but not others. In these schools, the teachers who opposed grouping invariably included the math teachers, and sometimes others as well. Opposition to de-tracking did not simply reflect an unwillingness to change, but real difficulties with teaching in a mixed-ability context. Several teachers commented on their struggles with low-achieving students in regular classes.

Others reported that "bright students" were being held back in heterogeneous classes. At two schools, honors classes were formed in response to pressures from parents concerning the need to challenge high-achieving students.

Of the three schools that were fully de-tracked, one showed clear evidence of success in presenting rigorous, authentic academic challenges to students of varied achievement levels. This school, Cibola High School, provides an important and instructive case of successful mixed-ability teaching, and we elaborate on it more fully below.

In contrast, mixed-ability grouping in Wallingford and Marble Canyon High Schools appeared to result in a loss of academic rigor. In Wallingford, teachers geared pedagogy and curriculum content to their low expectations for the lower-achieving students. Almost none of the observed classes exhibited more than a minimal amount of thoughtfulness and depth. In math, we never observed students discussing problems with one another; all the lessons used traditional lecture and recitation formats. For the most part, students' tasks consisted of applying algorithms to routine computations. Two teachers acknowledged they had lowered their standards for heterogeneous classes, and one said he had given up trying to cover all the intended material. This resulted in students being promoted without being prepared for the next math course. Teachers at Marble Canyon also held low standards for student performance. These examples of unsuccessful heterogeneous grouping make closer analysis of the success at Cibola High School even more imperative.

Overall, observers in 8 high schools found no systematic differences in instructional quality tied to grouping methods. Those teachers who provided high-quality instruction were found in both high-track and heterogeneous classes. Often these teachers were the leaders in school restructuring efforts, and their teaching styles seem to result from their own individual commitments rather than from school-wide restructuring. Other teachers in heterogeneous classes used conventional methods of lecture, recitation, and seatwork, and often the intellectual substance of their lessons was weak, more like typical low-track than

high-track classes. These findings were characteristic of both social studies and math. The major exception to this pattern is Cibola High School, where we observed effective authentic instruction in heterogeneous classes in both subjects on a school-wide basis (see below). On the whole, the most one could say for the impact of heterogeneous grouping on instruction is that it made it possible for outstanding teachers to become more effective with students of diverse abilities.

Middle Schools

Among the eight middle schools, only one used mixed-ability grouping exclusively in all subjects. Observations in this California middle school indicated that instruction was rarely characterized by higher order thinking, depth, or discussion of substantive issues (although standards for student performance were not as weak as in two of the de-tracked high schools). Thus, of the sixteen middle and high schools, Cibola High School was the only one to provide evidence of consistently high-quality instruction in a fully heterogeneous context.

The other seven middle schools each offered at least one high-track math class in eighth grade -- usually an algebra class -- and several had honors classes in additional grades or subjects, typically language arts. Social studies, by contrast, was heterogeneously grouped in all eight middle schools. The widespread conviction that some degree of grouping was needed in mathematics appeared to have three main sources: Pressure from high schools to have some entering students prepared for higher-level mathematics; pressure from parents for advanced math study for their children; and many teachers' perception that math, as a sequential subject matter, can be taught more effectively when students are grouped by performance level. These observations replicate Loveless' (1994) findings that the tendency to retain ability grouping in middle-school math derives from the position of this subject in the K-12 curricular sequence and from educators' views of mathematics as a hierarchical, linear subject matter.

Although no middle school in our study achieved the ideal of "one advanced, high-level curriculum for all" (to quote one school's slogan), several schools had taken substantial steps towards reducing their

degree of internal stratification. First of all, none of the eight schools had separate remedial programs or even identifiable remedial classes. Typically, low-performing students were mixed with students of average achievement, even in mathematics. Second, none of the schools exhibited rigid, full-day tracks which are commonly found in junior high schools. Third, several schools had reduced the number of levels into which students were differentiated, often eliminating ability grouping entirely from sixth grade. Among the middle schools, mixed-ability teaching more often occurred in schools that had a conscious strategy of de-tracking. In two schools, inequalities of learning opportunities had not arisen as an area of major concern, and these schools exhibited more conventional tracking systems (though without low-level classes in most subjects).

As in the high schools, the implications of minimizing ability grouping for instructional quality in the restructured middle schools were limited at best. Isolated instances of highly authentic instruction reflected individual teacher commitments to intellectual rigor, rather than successful school-wide implementation of high standards. This occurred here and there in both social studies, which was fully heterogeneous in all our schools, and in math, which was less differentiated than one finds in conventional schools but still retained some degree of ability grouping.

An exception to the general pattern was Red Lake Middle School, located in an urban area in the Pacific Northwest. Red Lake was one of two schools in our sample in which educators responded to the problem of differential opportunities by promoting student choice of classes, as a way of fostering equal opportunities. These schools had reduced the emphasis on ability levels, and had reduced the number of different levels from among which students chose. Nonetheless, math courses in these schools were stratified by student skill levels through self-selection.

At Red Lake Middle School, classes at all levels were characterized by strong emphasis on authentic instruction. This important and revealing case will be elaborated below. The other school that emphasized student choice of courses, Selway Middle School, had substantially minimized the status hierarchy that typically accompanies differentiation. However, in this school, whether one encountered authentic instruction

depended on the teacher: some teachers emphasized authentic instruction while others relied on more traditional methods. In both Red Lake and Selway, observers found the most authentic instruction in the higher-level math classes. However, at Red Lake all classes were generally characterized by authentic instruction, while at Selway observers found instruction that emphasized memorization of fragmented bits of information in several classes outside the most challenging level. How did Red Lake manage to promote authentic instruction on a school-wide basis, despite the vestiges of ability grouping? This issue is explored in a case analysis below.

Elementary Schools

As in the high schools and middle schools, educators in the restructured elementary schools we studied generally believed that equal opportunity to learn was a pressing concern. With one exception, the elementary schools avoided the most rigid forms of differentiation that typically prevent equality of opportunity from being achieved: tracks into which students are divided for the entire day, near-permanent placements for students, and consistent consignment of less-experienced teachers to low-level ability groups. Several of the elementary schools employed heterogeneous grouping for all instructional contexts. It is difficult to be more precise about this finding, because although students were divided heterogeneously for most of the day, pull-out programs and within-class groups tied to students' performance levels introduced some degree of differentiation into the structure of students' opportunities. It is likely that within-class groups for reading occurred in more cases than we recognized, because our observations targeted math and social studies in grade 5.

Issues of differentiation and opportunity were less contentious in the elementary schools than in the secondary schools we studied. Generally, teachers seemed at peace with the substantial reduction in differentiation in their schools, as well as with the various accommodations (such as within-class grouping) that occurred. Elementary school teachers found ways of individualizing instruction in the heterogeneous

context. Their approaches included extra time for students experiencing academic difficulty and providing help from teacher aides or resource teachers as well.

The major exception to this pattern was Ashley Elementary School, located in a southern city. Ashley contained a state-mandated program for gifted students, in which about one-third of the students participated. Students in the gifted program had entirely separate classes from other students. Most teachers viewed this rigidly differentiated structure as a threat to equal opportunity, and were committed to providing similarly high-quality instruction to students in the regular and gifted programs. In this, they largely succeeded, as revealed by our observations. Higher order thinking, depth of instruction, and substantive discussions were similar in regular and gifted classes. Instruction in math was particularly revealing: we observed four lessons offered in each of two regular and one gifted class, and found substantial evidence of high-quality, authentic instruction in virtually every lesson. One cannot conclude, however, that differentiation in this school facilitated high-quality instruction in all classes, because the teachers actively opposed the distinctions they were required to make. In this school, instruction succeeded in spite of the grouping program, not because of it.

Key Findings

This overview of highly restructured schools reveals a number of central findings. Some are consistent with the data from the larger sample of nominated schools. The case studies indicate that heterogeneous grouping is more problematic for teachers in math than in social studies. Also, we found that educators in high schools and middle schools experienced more conflict than those in elementary schools in trying to minimize grouping and tracking.

Math vs. social studies. Math teachers cling tightly to the notion that their subject must be taught sequentially, with certain concepts and skills mastered before others can be introduced. No such beliefs were evident in social studies. In math in one high school, it was considered a revolutionary innovation when students were permitted to take algebra 2 before geometry. In another school, allowing students to take a

double math course so they could catch up in the sequence was a major innovation. If one enters a high school with weak basic skills, one is assigned to pre-algebra; on the other end, if one has already taken algebra, one enters geometry. That is how tracking occurs in secondary-school math.

Math teachers' reluctance to de-track is clearly tied to their conception of subject matter. Ball (1981) observed a similar pattern in his study of a British secondary school. Grossman and Stodolsky (1994) and Loveless (1994) reported survey findings indicating that math teachers view their subject as more highly sequenced, defined, and static compared to teachers in other subjects. These conceptions are reflected in math teachers' view that students can be taught more effectively when they are divided into groups of students whose math skills are similar.

Data from the 24 restructured schools do not indicate whether sequencing is an inherent and necessary feature of math instruction, or whether teachers' perceptions, and not the subject matter itself, prevent them from overcoming the sequencing view to accommodate heterogeneous classes. It is clear that teaching mixed-ability classes requires substantial extra effort in preparation, working with students individually, and simultaneously monitoring multiple groups or activities within the classroom. Perhaps the teachers who objected to mixed-ability grouping in math did not wish to make the effort; more likely they did not conceive of it as possible, and did not know how to go about doing it.

The case studies do show that high-quality instruction is possible in heterogeneous math classes. We observed it not only in several elementary schools, but also in Cibola High School, where teachers were committed to mixed-ability teaching, held high standards for academic work, and engaged in high-quality instruction with their students. This case raises the possibility that it is the perception rather than the reality of mathematics that requires ability grouping, although it may take special conditions for high-quality math teaching in a mixed-ability context.

Elementary vs. secondary schools. Elementary schools were far more likely than secondary schools to be totally mixed-ability grouped. Several facets of elementary schools may have made heterogeneous

classes easier to cope with than in their secondary-school counterparts. First, the student body of an elementary school is more homogeneous within grade levels than that of a typical middle or high school, and this was clearly true in our sample of restructured schools. Elementary school teachers dealt with a narrower range of skills within their heterogeneous classes, compared to secondary schools. Second, elementary school teachers have greater flexibility in arranging time for working with students who are falling behind, since they control their students' schedule for most of the day, rather than a single period. Third, elementary school teachers have greater curricular flexibility than secondary teachers, even when compared to the highly restructured secondary schools in our sample. This flexibility permitted elementary teachers in one school, for example, to devote most of the first three grades to reading and math, virtually ignoring science and social studies until grade four, as a way of allocating sufficient time to accelerate the basic skills learning of all students.

Grouping and instruction. Other findings go beyond what was evident in the analysis of nominated schools. The case studies reveal that neither differentiation by skill level nor heterogeneous grouping present insurmountable barriers to high-quality instruction, but neither do they ensure it. From the evidence presented thus far, we cannot conclude that one system or the other is more conducive to high-quality instruction. The case studies are consistent with findings from previous research that homogeneous grouping encourages higher-quality instruction in high-ranked groups. Since the schools we studied had largely eliminated remedial and other low-level classes and programs, the most deleterious effects of tracking were avoided. Still, in schools that retained vestiges of grouping, authentic instruction was more common in high-ranked classes than in regular classes or lower-level classes.[1] Moreover, the case analyses show that heterogenous grouping can result in high-quality instruction for all students, in some instances.

Conditions that Support Equal Opportunity

Under what conditions do heterogeneous classes result in equally high-level opportunities for learning? When does ability grouping yield high-quality instruction for all students? These are the critical

questions raised by our analysis of the 24 restructured schools. To address them, we provide more in-depth accounts for two schools: Cibola High School, which was totally heterogeneously grouped, and Red Lake Middle School, which was somewhat differentiated through student choice of math levels. In both cases we focus on math at the secondary level, because that is where the most difficult struggles with differentiation and opportunity occur.

Cibola High School: Equal Opportunity for High-Quality Academic Work

Cibola High School is situated in the heart of a large east coast metropolitan area. It was founded in the mid 1980's as an alternative school in the jurisdiction of the city's "alternative school district," a semi-autonomous administrative unit dedicated to providing the schools in its charge with sufficient autonomy from district and state regulations to experiment with different educational programs. This includes autonomy from union contract agreements, district hiring practices, transfer by seniority and district licensing regulations.

Covering grades 7-12, CHS is divided into three self contained "divisions" serving grades 7-8, 9-10, and 11-12, respectively. The 450 students at CHS reflect the city's diversity: 43% are African American, 42% are Latino, 12% Caucasian, and 3% Asian American. Slightly over half (51%) of the students are on free or reduced lunch, i.e., are low SES.

There are no tracks at CHS. In Divisions I and II (grades 7-10) all students are heterogeneously mixed. Within Divisions, students are arranged in two houses which stay together with the same subject area teachers for two years. The curriculum is strongly integrated, with math-science taught as a single class, and the same for humanities (English-social studies). Ability level plays no part in assigning students to the different houses, and teachers teaching the same subject matter, as observed by the CORS researchers, were working on precisely the same assignments on the same days. Furthermore, there was no apparent in-class differentiation of students into high and low ability groups. When small groups were formed for project work, the groups were heterogeneous by ability.

In Division III (grades 11-12), the curriculum more closely resembles that of a conventional high school curriculum. Students take classes that are organized along the lines of the traditional disciplines. Mathematics, for instance, is taught separately from the sciences in courses such as algebra-trig I and II and geometry. The major departure from traditional practice in Division III is its use of portfolio assessments for graduation. Students must organize 14 "portfolio items," one of which is in mathematics. The mathematics portfolio includes evidence of passing scores on both the state competency test as well as a teacher devised test, and projects stressing "higher order thinking" applying mathematics to issues in social studies and a separate project involving mathematics in science or "pure" mathematics. Seven of the portfolios are chosen by the students, and are presented in an exhibition to a committee consisting of two teachers, another adult, and a student. To evaluate the students' portfolios, the committees use a grid consisting of 5 four-point scales: viewpoint (which looks at the depth of the students work), connections (which looks at the logical organization of the work and its overall significance), evidence (which examines the quality of argument made by the students), voice (which asks if the student's work is engaging), and conventions (which concerns itself with the correct use of format).

CHS was one of three high schools in the CORS sample that used "de-tracking" to address problems of equity, but unlike the other two, CHS teachers showed high levels of authenticity in both their instruction and assessment. CHS, in fact, had the highest overall ratings in authentic classroom instruction and student achievement of any of the 24 schools. More specifically, the classroom observations indicated that all but one of the mathematics lessons involved substantive conversations as part of the class; five of the lessons scored very highly on our measures of higher order thinking indicating that synthesis, evaluation, creative thinking occurred throughout the class period and similarly, in these same lessons, material coverage was focused and sustained, i.e., the teachers helped students explore a single topic in great depth rather than using a scattershot approach. Finally, aside from these intra-classroom measures, the school has achieved a record

of success in terms it judges important: a four-year dropout rate of only 4% and over 90% of their students go to college.

How has Cibola managed to maintain high standards and authentic instruction in mixed-ability classrooms? To start with, teachers at Cibola reject the notion of "teaching down" to students' abilities. Rather, students having problems are expected to attend tutorial sections on Saturdays for remediation. These tutorial sessions allow teachers to meet the needs of students who are falling behind and still hold high expectations. As one Division II math-science teacher explained:

> I've told the kids, 'If you need work on your basic math skills, I don't slow down for you. You're supposed to be putting in extra time. We have somebody here on Saturdays. You can stay after school... On Saturday the library is open. There are two teachers and a resource teacher there to tutor.'

Beyond providing additional assistance out of class, within classes teachers emphasize individualized attention, in contrast to the whole class approach taken, for instance, at Wallingford High School (another de-tracked high school, and the school that provided the lowest levels of authentic instruction and achievement in the study). One humanities teacher at Cibola explained that to teach writing to students with varied skills, she held conferences with each student, and also asked students to meet with one another and with other teachers. This type of individualization is supported by small classes (20 students maximum), and by students staying with the same teachers for two years. Also, 45 minutes are set aside daily for advisement in which smaller groups (12) meet with one of their Division teachers or an administrator assigned to them as an advisor. As one teacher explained, the advisory period is crucial both for developing rapport with the students and for pushing them to keep on top of their assignments.

> The advisor is very linked to this. The kids in my class and in my advisory, they know I care and they know I call [home]. If they were in somebody else's advisory, depending on how much that advisor cares also relates to how well they do in my class. My class and my advisory, I would say--- It's really hard for me to put a number. But every kid I've worked with I've seen progress.

Teachers also emphasized that grading is highly individualized. The major assessment tools in the math-science class are exhibitions that occur four times over the course of the year. When speaking about how they

graded students, teachers were quite open about the individualizing of grading schemes, and that students were accustomed to seeing each other's papers scored on very different standards. This individualized assessment was also institutionalized in Division III through graduation portfolios. In all Divisions, individualization occurs in a context of serious academic content.

Beyond even these particulars is a school culture that stresses collaboration and innovation. Unlike Wallingford, CHS teachers are expected to generate creative integrated curriculum in cooperation with each other. A number of waivers have been won by the school exempting them from many state and district requirements, facilitating the teachers' abilities to innovate. The paired teachers (math-science and English-social studies) also team teach so that collaboration extends beyond the development of the curriculum and into the classroom itself.

For math teachers, the culture of innovation included the perception that their subject is not rigidly bound by a predetermined sequence. As one teacher explained,

> We don't place as high an emphasis on (basic skills) as other schools...Yes, they are getting basic skills, but we're not using those skills as a gateway to determine whether or not they are going to be successful in math...We would not say, 'Look, you can't take this class because you weren't able to pass the (competency test). So, we have a lot of kids who have done beautiful projects involving geometric designs in the Senior Institute but can not add fractions. We value that. At the same time we say, 'Look, you haven't been able to add fractions.'

More important for the high quality of instruction in the math program, the waivers have permitted the math department in Division II to jettison the usual algebra/geometry organization of the mathematics curriculum and instead tie the mathematics content to complex problems involving modeling and design which relate to real world phenomena, e.g., exploring the physics of amusement park rides designed by the students themselves.

Many material conditions also facilitated high academic standards within this de-tracked school. Class sizes were much smaller than in the other de-tracked high schools. In addition, CHS raises a large amount of outside money, as much as $150,000 per year, through a variety of foundations. These funds support the Saturday tutorial opportunities noted above, among other programs. More important may be that

both the staff and students are more carefully selected at CHS than in conventional public schools. The principal has free reign to pick the staff, including teachers from outside the district. This has helped create a community with a common ideology: "Helping students learn to use their minds well." Moreover the students are selected to some degree, through two mechanisms. First, 80% of the students come from feeder schools created by the principal with a similar philosophy -- any student wishing to attend CHS from these schools only needs to apply. These students, therefore, are already familiar with the integrated, small group approach to learning continued at the High School. The remaining 20% must apply. The administrative staff explained they both pick the best and brightest from this pool. However, they also use this pool to help them achieve the 51% free lunch students needed for them to receive supplemental funds. The fact that this is a school of choice means that staff and administrators can threaten students with transfers if they will not work within the norms established by the school. The principal was frank about this:

> It would have been hard to be this free if we had captive parents, captive kids. From one side of it--our side--it gave us the freedom to say what we thought was good education and what we wanted to try to do, and if that isn't what you want, then you've chosen the wrong school.

The process of choice helped secure parental support for the program. Because parents had to agree to the school philosophy before enrolling their children, there were none of the pressures for differentiated programs, e.g., gifted and talented programs, that often occur in community schools (see Loveless, 1994).

Finally, the school is characterized by strong intellectual leadership. The principal has worked hard to bring in outside academics to assess their programs. The administration also pushes the staff to rethink what they are doing. At their annual retreat, for instance, the principal asked the staff to make the distinction between academic learning and intellectualism and to examine the role that each should play in the school.

To summarize, Cibola provides its students with a common interdisciplinary math curriculum characterized by higher order thinking. This curriculum is made possible by a variety of waivers. The quality of the curriculum is also dependent on small classes, a select faculty and students, and strong, visionary administration. The individualization of student assessment occurs within the framework of these complex

tasks, and even though in teachers' evaluations of students it was clear that some students were held to much lower standards the overall complexity of the tasks coupled with an emphasis on group work meant that all students experienced relatively high levels of authentic instruction.

Cibola High School demonstrates that de-tracking need not be accompanied by low standards. It also points to the variety of conditions that may be required to support those high standards, including strong intellectual leadership, small class size, some control over who attends and who teaches at the school, and resources that permit extra tutoring for students who may be falling behind.

Red Lake Middle School: "Teach to your passion"

Red Lake Middle School is located in a small city on the West Coast. Covering grades 6 to 8, it houses 45 faculty and 800 students. There have been two periods of restructuring at the school. In the early 1970s the school dropped subject area requirements. Seeking relief from state mandates about subject areas brought on a struggle with the state's board of education. While the school was not wholly successful, the struggle itself helped create a strong sense of community among the teachers. Later, towards the end of the 1980s, under a new principal, the school restructured its decision making structure, created an environment to support interdisciplinary classes, began to reduce its use of tracking, and adopted 70 minute classes.

The attendance area for RLMS contains the richest and poorest areas in the city, and the school draws about 2/3 of its population from this area. The remaining third apply to the school from all over the city. While the school is 90% white, the assistant principal said that the school was the most diverse in the district, and the remaining 10% are fairly evenly divided among African American, Hispanic, Native American, and Asian/Pacific Islander students.

Teachers and administrators often stated that they were committed to getting "rid of" tracking. The principal pushed the staff to think through the issues of equity tied to tracking:

> The commitment of the school is to get rid of [tracking]. When I first came here, the 6th grade cultural connections classes were leveled (i.e., classes were designated high, medium, or low level)...You name it, and there were levels in this building. They had levels 8,9,10,11,12,13, and 14. And they had kids, sixth graders, in all those levels. You'd come up to a sixth grader and say, 'How

> are you?' They'd say, 'Well, I'm a level 8.' And the worst part is, they were keyed to the Scott Foresman reading series...And they had it emblazoned on their foreheads. So, I started getting every Jeannie Oakes article and every other article I could get and started inundating people. And it became very clear by the amount of paper load where I was on this issue.

While there has been a decrease in the number of tracks (in language arts they went from 5 to 2 levels), a high degree of differentiation still exists at the school. This differentiation takes three forms. First, there are self-contained programs. At the highly academic end there is a French immersion program, at the low end there are self-contained special education classes. Second, within the main "track" there are several "levels" in the various disciplines: four in math, two in English. Finally, differentiation occurs through pre-requisites. In science, for instance, the chemistry class has a certain number of other science-courses as a prerequisite to ensure familiarity with laboratory techniques.

According to teachers, ability grouping in the main program occurs through student self-selection. Students are not directly assigned to one level or another. Instead, the students "group themselves" through the system of student choice about classes (student choice is one part of the school's ideology), and the advisory system. This choice system can produce its own inequalities. One math teacher complained to the administration that girls were self-selecting into lower tracks, and as a result of his complaints, the administration forced a gender-balance in his classes the year CORS visited the school.

A second example of administrative intervention was the creation of the 6th grade transition (pre-algebra) class which permitted students to take algebra in 7th grade. Students are placed in this class by testing at the 95th percentile on the CTBS math test and getting recommendations from both their math and reading teachers. These two examples shows both the ways the administration works to produce greater differentiation as well as consciously works to rectify the inequities produced by that differentiation.

Differentiation in mathematics happens for most students through a complex decision tree at the end of each year. The 6th graders not in the Transition class are enrolled in Explorations (no choice) but then can move on to three different courses in the 7th grade: Concepts, Applications, or Transitions, marked according to the school's curriculum guide by "changing emphases in scope and sequence...In the different

math levels, the topics are covered at increasing levels of difficulty and complexity." In the 8th grade they then branch out again depending on whether they have had Transitions up to this point. If they have, they can take Algebra, otherwise they take Applications or Transition Math. Eighth graders who have had Algebra go to a nearby high school to study geometry.

Because of the complex branching of possibilities offered by Red Lake's mathematics program students at the end of their middle school education may be ready for everything from pre-Algebra to Algebra II, approximately 4 levels of mathematics, a much wider range than produced by most middle schools. This has been narrowed a little after our data collection year. The lowest track, consisting of the path from Conceptions to Applications in 8th grade, which would subsequently place students in pre-algebra or remedial math, has been replaced by a two year transitions class, meaning that all of Red Lake's students are minimally ready for Algebra I at the time they graduate. Thus, although students are differentiated, the differentiation occurs at a high minimum standard for all students.

Despite the differentiation, CORS observers noted that no class had the ambiance of despair or disappointment typically found in lower level tracks. Furthermore, despite the "leveling" (the school's language for tracking), classes at all levels scored highly on our measures of instruction and achievement. The students ranked third out of the 24 schools studied in authentic assessment in mathematics, and the math teachers received the same rank for quality of instruction (authentic pedagogy). Of the math classes CORS researchers observed, 8 out of the 12 demonstrated in-depth, intellectually rigorous content for most of the lesson (high depth) and in 7 of these classes students were engaged in higher order thinking (synthesis, evaluation, etc.) through most of the class period.

Red Lake Middle School is remarkable in that it has achieved high-quality instruction and achievement within a differentiated structure. Even the lower level math classes observed by the CORS team received relatively high scores: two of the four transitions classes scored highly both on the depth of the material covered and extent of substantive conversation, i.e., conversation that was dedicated to exploring the

material. These two classes also showed substantial amounts of higher order thinking throughout the periods observed. In fact, these classes scored higher than most *upper level track* classes at the other schools CORS visited.

It should be noted, however, that even at this school these lower tracks received lower scores than the upper level track (Algebra I) classes we saw, consistent with concerns about the impact of differentiation on equity. This difference may reflect differences in personal beliefs between the teacher in the lower track and the teachers in the upper ones rather than the effect of structural features of the school. The teacher of the lowest level math class, whose scores were lower than the other teachers, stood out in our sample as being opposed to heterogeneous grouping of students. The research team also felt that his beliefs about pedagogy were more traditional than the other teachers. Since the teachers rotate the classes, had we seen classes at another time, it may well have been that upper track classes would have received a low score.

What accounts for the relatively strong pedagogic performance of the math classes at the school regardless of level? First and foremost is an ideology that stresses not simply choice for students, but that teachers should "teach to their passions." That is, teacher choice is also held as a value. This emphasis on "passion," expressed to CORS by both teachers and the principal, translates into an emphasis on "depth" in the classes we saw. In other words, intellectual passion is unlikely to express itself as fragmented knowledge. Furthermore the emphasis on teacher passion *may* lead to higher expectations of the students because of their own investment in the material. It should be noted that there are no specific structural supports to push teachers to demand high quality work from low track students, only the elimination of standardized remedial curriculum.

Such an ideology, however, needs support to be realized. To start with, teachers at the school are free to develop their own curriculum; there are no state or district requirements. While there are statewide tests, the school has, either because of or in spite of their restructuring efforts, scored highest in the district (the restructuring effort is too recent to draw conclusions about its contribution to standardized test scores).

Second, the ideology of choice for both teachers and students is facilitated by the principal who deeply believes in the staff's freedom.

It should be noted that in addition to subject area classes there are a wide variety of untracked inter-disciplinary classes, of which students are required to take a fixed number. Yet these classes scored relatively poorly as compared to the observed math or social studies classes. One reason why instruction may be better in the disciplines, tracked or untracked, than in these vaguer "Connections" classes is that the history and professional activities of social studies and math teachers has provided a set of accepted standards. Thus, one explanation for the pattern we found is that teaching to one's passion leads to high levels of instruction and achievement when those passions are tied to disciplinary knowledge. A second set of standards in mathematics specifically could be seen as the indirect result of the mathematics teachers' decision to "de-track" and to push all of their students into algebra by the start of high school. This would require some accelerated instruction for the lower tracks, though it is hard to know whether the teacher we observed teaching Transitions was affected by these goals, given that he was not a proponent of de-tracking.

Other supporting factors may include a relatively homogeneous student body. The student population is almost entirely white, and though approximately 30% are low SES, that is still relatively affluent compared to Cibola (51%) and Wallingford (56%). At the same time, teachers have achieved their high scores despite difficult working conditions. Almost all of the classes at Red Lake suffer from overcrowding. Average class size at the school is between 30 and 35 students (compared to 20 at Cibola). Teachers see up to 180 students per week (compared to 40 at Cibola). Given these difficulties, Red Lake's accomplishment may be viewed as high-quality instruction and achievement within a differentiated curriculum.

Conclusions

The study of highly restructured schools shows that de-tracking is a goal that is often desired but rarely achieved. When it is achieved, moreover, it brings no guarantee of high-quality instruction for all students. In some cases, de-tracking brought equality, but at a low level for all.

The case of Cibola High School shows that high-quality instruction in mixed-ability classes is possible, even in secondary school mathematics, which is probably the most difficult place to carry out de-tracking. High-quality instruction relied on individualization, varied expectations (but at a high level for all students), and authentic assessments such as portfolios. Why did teachers at Cibola succeed where others had not? First, they had the advantage of resources such as small classes and substantial additional funding that support their individualized approach. Second, the school has the strong intellectual leadership of the principal who, by selecting her staff, has established a community of like-minded teachers. Third, students are to some degree selected, although they still represent a cross-section of the community and include a substantial number of the disadvantaged.

Examination of Red Lake Middle school indicated the possibility of high-quality instruction in more homogeneously grouped classes. Here, too, we found an emphasis on intellectual rigor, this time expressed through the mandate of "teach to your passion." It is interesting to note that the administrator and most teachers at Red Lake expressed commitment to high standards for all students, recognizing the dangers of differentiation. This likely contributed to successful teaching across levels.

It is interesting to note the features that characterize *both* Cibola and Red Lake. Both schools exhibited intellectual rigor, manifested at Cibola by the principal's leadership and by teachers' emphasis on high standards, and at Red Lake by teachers' passion for teaching their disciplinary subject matter. Also, educators at both schools expressed a strong commitment to equity; at Cibola this was reflected in the absence of tracking, while at Red Lake the commitment to equity led to a reduction in tracking, and concern for equal access for students through choice, and high-quality instruction across tracks. Finally, differentiated

instruction occurred in both schools. Whereas differentiation characterized the overall structure of Red Lake, instruction at Cibola was differentiated through within-class individualization and varied expectations for students.

These findings suggest that intellectual rigor, commitment to equity, and the use of differentiation in a way that does not contradict equity, are common ingredients in schools that provide high-quality academic experiences for a broad range of students, irrespective of the school's structure. Indeed, these conditions are probably more fundamental than the school structure itself for promoting academic excellence and equity.

Note

1. Quantitative analysis shows modestly higher levels of higher order thinking, depth, and substantive conversation in high-track classes compared to "regular" classes, and lower levels of these aspects of instructional quality in the very few low-track classes in our sample (see Newmann, Wehlage, and Secada, 1995, for further details on these measures of instruction). However, the differences are not statistically significant, and the quantitative analysis is weakened because classes were not selected for observation to mirror the structure of differentiation in the schools.

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Table 1. Types of ability grouping used in nominated restructured schools that claimed to have minimized ability grouping, but in which salient forms of grouping remained.

Type of Grouping	Percent of high schools	Percent of middle schools	Percent of elem. schools
Mathematics			
Between-class	97%	82%	41%
Within-class	0%	9%	11%
Special honors class	39%	24%	0%
Special remedial class	0%	3%	0%
Social Studies			
Between-class	63%	21%	26%
Within-class	0%	3%	7%
Special honors class	17%	3%	0%
Special remedial class	0%	0%	0%
Other subjects			
Between-class	44%	28%	38%
Within-class	0%	0%	4%
Special honors class	20%	9%	0%
Special remedial class	0%	0%	0%
Overall separate honors program	10%	15%	26%
Overall separate remedial program	0%	0%	0%
Number of schools	31	33	27